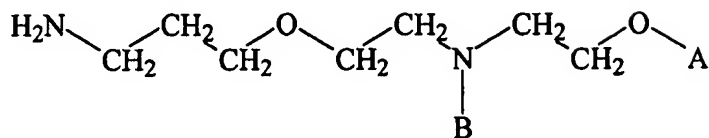


1 **WHAT IS CLAIMED IS:**

- 2 1. A composition comprising:
 3 an aqueous based continuous phase; and
 4 a shale hydration inhibition agent having the formula:



- 6
 7 wherein A is independently selected from H and $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$; and
 8 wherein B is independently selected from H, $\text{CH}_2\text{CH}_2\text{OH}$,
 9 $\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ and $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$; and
 10 wherein the shale hydration inhibition agent is present in sufficient concentration
 11 to reduce the swelling of shale.

- 12
 13 2. The composition of claim 1 wherein the shale hydration inhibition agent is the
 14 reaction product of a hydrogenation reaction of the product of the reaction of
 15 triethanolamine and acrylonitrile

- 16
 17 3. The composition of claim 1 wherein the shale hydration inhibition agent is the
 18 reaction product of a hydrogenation reaction of the product of the reaction of
 19 diethanolamine and acrylonitrile

- 20
 21 4. The composition of claim 1 wherein the aqueous based continuous phase is
 22 selected from: fresh water, sea water, brine, mixtures of water and water soluble organic
 23 compounds and mixtures thereof.

- 24
 25 5. The composition of claim 1 further comprising a viscosifying agent.

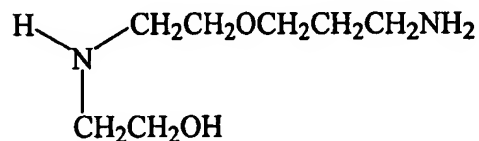
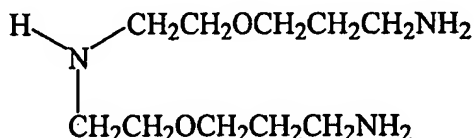
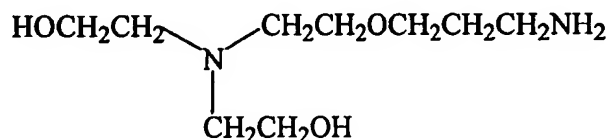
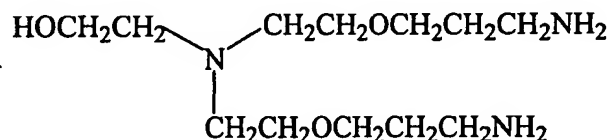
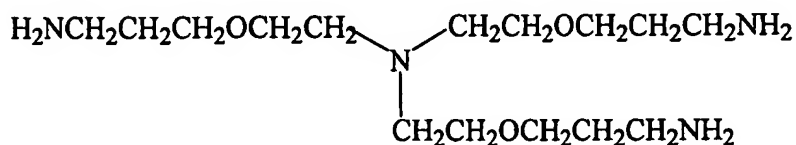
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1 6. The composition of claim 1 further comprising a weighting material selected from
 2 the group consisting of barite, calcite, hematite, iron oxide, calcium carbonate, organic
 3 and inorganic salts, and mixtures thereof.

4

5 7. The composition of claim 1 wherein shale hydration inhibition agent is selected
 6 from:

7



8

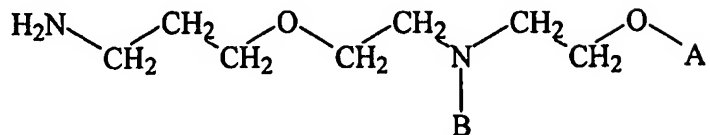
9 and mixtures of these.

10

11 8. A water-base drilling fluid for use in drilling a subterranean well through one or
 12 more subterranean formations containing a shale which swells in the presence of water,
 13 the drilling fluid comprising:
 14 an aqueous based continuous phase;

a weighting agent; and

a shale hydration inhibition agent having the formula:



wherein A is independently selected from H and $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$; and

wherein B is independently selected from H, $\text{CH}_2\text{CH}_2\text{OH}$, $\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ and $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$; and

wherein the shale hydration inhibition agent is present in sufficient concentration to reduce the swelling of the shale.

9. The composition of claim 8 wherein the shale hydration inhibition agent is the reaction product of a hydrogenation reaction of the product of the reaction of triethanolamine and acrylonitrile

10. The composition of claim 8 wherein the shale hydration inhibition agent is the reaction product of a hydrogenation reaction of the product of the reaction of diethanolamine and acrylonitrile

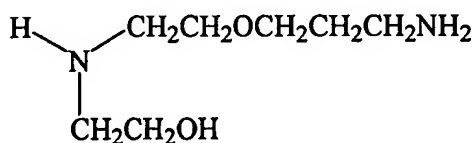
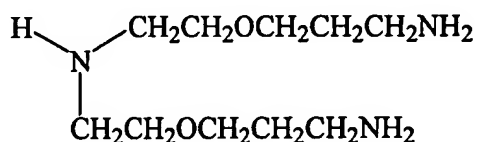
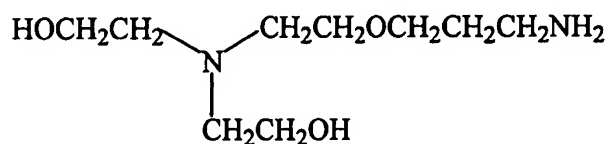
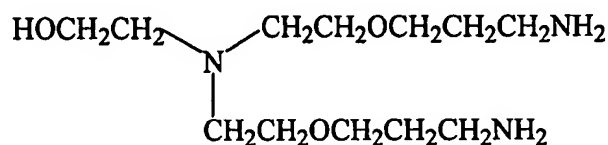
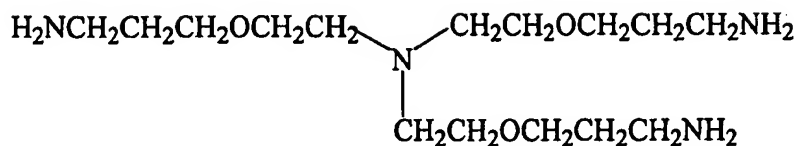
11. The composition of claim 8 wherein the aqueous based continuous phase is selected from: fresh water, sea water, brine, mixtures of water and water soluble organic compounds and mixtures thereof.

12. The composition of claim 8 further comprising a viscosifying agent .

13. The composition of claim 8 wherein the weighting agent is selected from the group consisting of barite, calcite, hematite, iron oxide, calcium carbonate, organic and inorganic salts, and mixtures thereof.

- 1 14. The composition of claim 8 wherein shale hydration inhibition agent is selected
2 from:

3



4

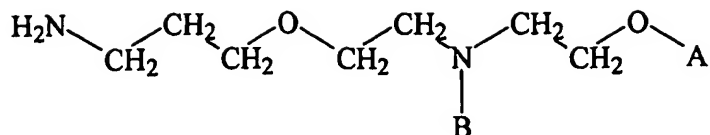
5 and mixtures of these.

6

- 7 15. A drilling fluid for use in drilling a subterranean well through one or more
8 subterranean formations containing a shale which swells in the presence of water, the
9 fluid comprising:

- 10 an aqueous based continuous phase;
11 a viscosifying agent and
12 a shale hydration inhibition agent having the formula:

13



1

2

wherein A is independently selected from H and $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$; and

3

wherein B is independently selected from H, $\text{CH}_2\text{CH}_2\text{OH}$,

4

$\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ and $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$; and

5

wherein the shale hydration inhibition agent is present in sufficient concentration to

6

reduce the swelling of shale.

7

8

16. The composition of claim 15 further comprising a viscosifying agent.

9

10 17. The composition of claim 15 further comprising a weighting material selected
11 from the group consisting of barite, calcite, hematite, iron oxide, calcium carbonate,
12 organic and inorganic salts, and mixtures thereof.

13

14 18. A fracturing fluid for use in a subterranean well through one or more subterranean
15 formations containing a shale which swells in the presence of water, the fluid comprising:

16

an aqueous based continuous phase;

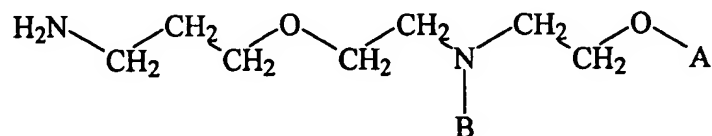
17

a viscosifying agent and

18

a shale hydration inhibition agent having the formula:

19



20

21

wherein A is independently selected from H and $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$; and

22

wherein B is independently selected from H, $\text{CH}_2\text{CH}_2\text{OH}$,

23

$\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ and $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$; and

24

wherein the shale hydration inhibition agent is present in sufficient concentration

25

to reduce the swelling of shale.

26

1 19. The composition of claim 18 further comprising a viscosifying agent.

2

3 20. The composition of claim 18 further comprising a weighting material selected
4 from the group consisting of barite, calcite, hematite, iron oxide, calcium carbonate,
5 organic and inorganic salts, and mixtures thereof.

6

7 21. A method comprising

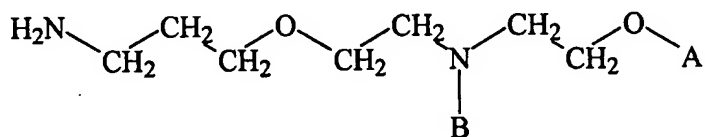
8 drilling a subterranean well through one or more subterranean formations
9 containing a shale which swells in the presence of water, wherein the drilling is carried
10 out using a drilling fluid including:

11 an aqueous based continuous phase;

12 a weighting agent; and

13 a shale hydration inhibition agent having the formula:

14



15

16 wherein A is independently selected from H and $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$; and

17 wherein B is independently selected from H, $\text{CH}_2\text{CH}_2\text{OH}$,

18 $\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ and $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$; and

19 wherein the shale hydration inhibition agent is present in sufficient concentration

20 to reduce the swelling of shale.

21

22 22. The method of claim 21 wherein the weighting agent is selected from the group
23 consisting of barite, calcite, hematite, iron oxide, calcium carbonate, organic and
24 inorganic salts, and mixtures thereof.

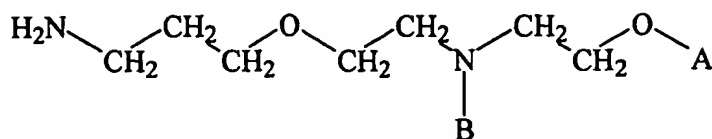
25

26 23. A composition comprising:

27 an aqueous based continuous phase;

28 a swellable shale material; and

a shale hydration inhibition agent having the formula:



wherein A is independently selected from H and $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$; and

wherein B is independently selected from H, $\text{CH}_2\text{CH}_2\text{OH}$, $\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ and $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$; and

wherein the shale hydration inhibition agent is present in sufficient concentration to reduce the swelling of the shale.

24. The composition of claim 23 wherein the shale hydration inhibition agent is the reaction product of a hydrogenation reaction of the product of the reaction of triethanolamine and acrylonitrile

25. The composition of claim 23 wherein the shale hydration inhibition agent is the reaction product of a hydrogenation reaction of the product of the reaction of diethanolamine and acrylonitrile

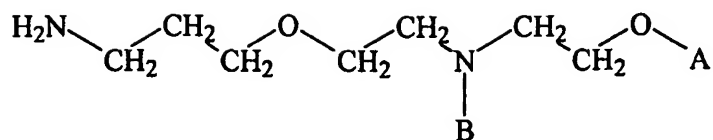
26. The composition of claim 23 wherein the aqueous based continuous phase is selected from: fresh water, sea water, brine, mixtures of water and water soluble organic compounds and mixtures thereof.

27. A method of disposing of drill cuttings into a subterranean formation, the method comprising:

grinding the drill cuttings in a water-base fluid to form a slurry, wherein the water based fluid includes:

an aqueous based continuous phase and

a shale hydration inhibition agent having the formula:



1

2

wherein A is independently selected from H and $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$; and

3

wherein B is independently selected from H, $\text{CH}_2\text{CH}_2\text{OH}$,

4

$\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ and $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$; and

5

wherein the shale hydration inhibition agent is present in sufficient concentration to

6

reduce the swelling of shale, and

7

injecting the slurry into the subterranean formation.

8

9

28. The method of claim 27 wherein the shale hydration inhibition agent is the reaction product of a hydrogenation reaction of the product of the reaction of triethanolamine and acrylonitrile

12

13

29. The method of claim 27 wherein the shale hydration inhibition agent is the reaction product of a hydrogenation reaction of the product of the reaction of diethanolamine and acrylonitrile

16

17

30. The method of claim 27 wherein the aqueous based continuous phase is selected from: fresh water, sea water, brine, mixtures of water and water soluble organic compounds and mixtures thereof.

20

21

31. A method of reducing the swelling of shale clay in a well comprising circulating in the well a water-base drilling fluid comprising:

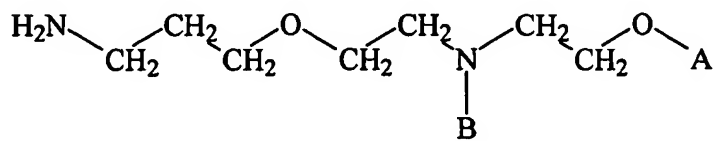
23

an aqueous based continuous phase and

24

a shale hydration inhibition agent having the formula:

25



26

1 wherein A is independently selected from H and $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$; and
2 wherein B is independently selected from H, $\text{CH}_2\text{CH}_2\text{OH}$,
3 $\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ and $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$; and
4 wherein the shale hydration inhibition agent is present in sufficient concentration
5 to reduce the swelling of the shale.

6

7 32. The method of claim 31 wherein the shale hydration inhibition agent is the
8 reaction product of a hydrogenation reaction of the product of the reaction of
9 triethanolamine and acrylonitrile

10

11 33. The method of claim 31 wherein the shale hydration inhibition agent is the
12 reaction product of a hydrogenation reaction of the product of the reaction of
13 diethanolamine and acrylonitrile

14

15 34. The method of claim 31 wherein the aqueous based continuous phase is selected
16 from: fresh water, sea water, brine, mixtures of water and water soluble organic
17 compounds and mixtures thereof.

18

19

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